NOTE: The document identifier and heading has been changed on this page to reflect that this is a performance specification. There are no other changes to this document. The document identifier on subsequent pages has not been changed, but will be changed the next time this document is revised.

MIL-PRF-39016/36B
20 JULY 1988
SUPERSEDING
MIL-R-39016/36A
23 June 1981

PERFORMANCE SPECIFICATION SHEET

(B) RELAYS, ELECTROMAGNETIC, ESTABLISHED RELIABILITY, HERMETICALLY SEALED, 4 PDT, LOW LEVEL TO 2 AMPERES (0.150-INCH TERMINAL SPACING), LATCHING, WITH INTERNAL DIODES FOR COIL TRANSIENT SUPPRESSION AND REVERSE POLARITY PROTECTION

This specification is approved for use by all Departments and Agencies of the Department of Defense.

The requirements for acquiring the product described herein shall consist of this specification and the latest issue of MIL-R-39016.

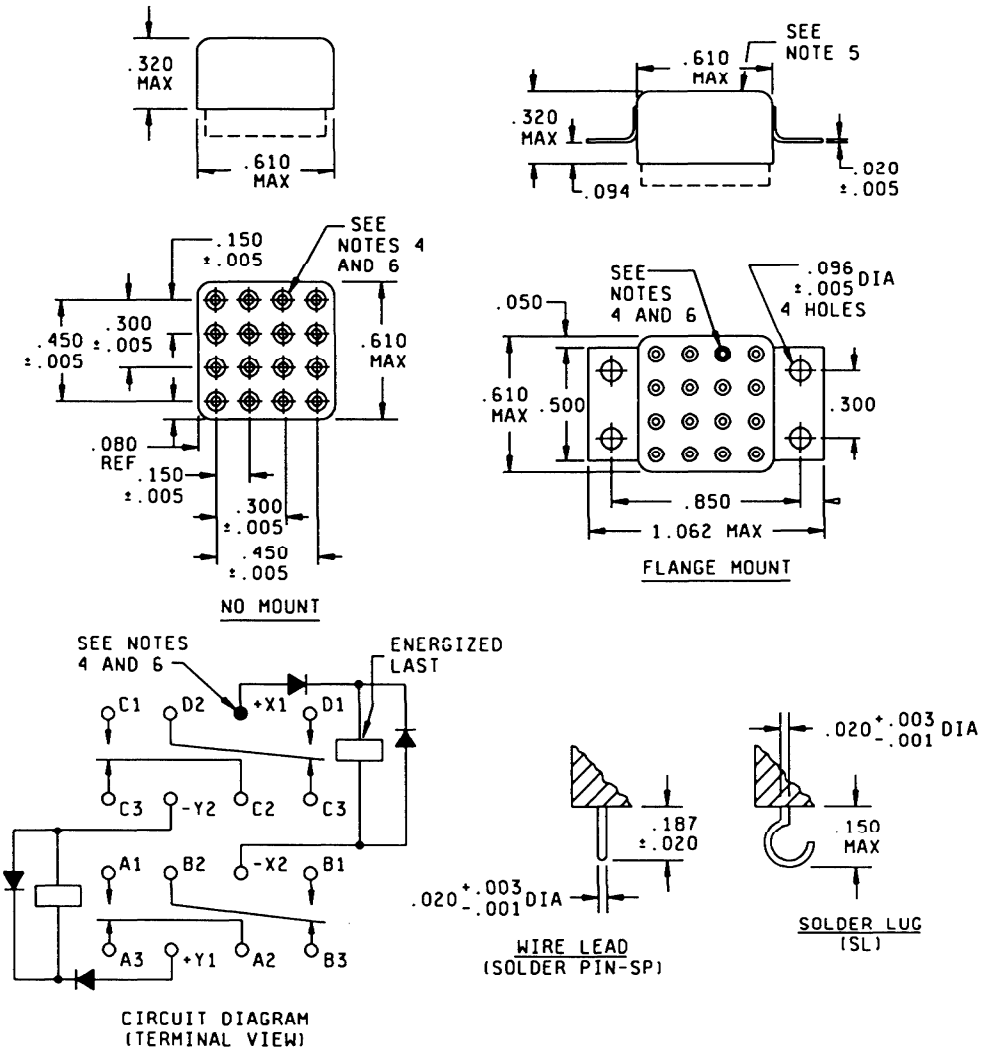

FIGURE 1. Configuration and circuit diagram.

(B) denotes changes

Inches	mm	Inches	mm
.001	0.03	.150	3.81
.002	0.05	.187	4.75
.003	0.08	.300	7.62
.005	0.13	.320	8.13
.020	0.51	.450	11.43
.050	1.27	.500	12.70
.080	2.08	.610	15.49
.094	2.39	.850	21.59
.096	2.44	1.062	26.97

NOTES:
1. Dimensions are in inches.
2. Unless otherwise specified, tolerance is ±.010 (0.25 mm).
3. Metric equivalents are given for general information only.
(B) 4. Terminal indicated shall be identified by a contrasting bead. Relay shall have (+) and (-) signs placed on the circuit diagram as shown above.
5. Circuit diagram marked on top of relay.
6. Energizing the indicated coil with the indicated polarity and voltage shall cause the relay contacts to assume the position shown.
7. Coil symbols are optional. See figure 1 of MIL-R-39016.
(B) 8. Terminal numbers in circuit diagram are for reference only. Numbers do not appear on relay.

(B) FIGURE 1. Configuration and circuit diagram - Continued.

REQUIREMENTS:

CONTACT DATA:

Load ratings:

High level (relay case grounded):

(B) Resistive: 2.0 ampere at 28 V dc. .125 ampere at 115 V ac (60 and 400 Hz). 0.5 ampere at 115 V ac (60 and 400 Hz) (case ungrounded). 400 Hz life test not required for qualification testing.

(B) Inductive: 0.5 ampere at 200 mH inductive at 28 V dc.

Lamp: 0.10 ampere at 28 V dc - Life test not required.

Low level: 10 to 50 µA at 10 to 50 mV dc or peak ac.

Intermediate current: Applicable.

Contact resistance and voltage drop:

(B) Initial: 0.050 ohm maximum.

High level:

During life: Not more than 5 percent of open circuit voltage.

(B) After life: 0.150 ohm maximum.

Low level:

During life: 33 ohms maximum.

(B) After life: 0.150 ohm maximum.

Intermediate current:

During: 1 ohm maximum.

(B) After: .300 ohm maximum.

Contact bounce: 2.0 milliseconds (ms) maximum. (Applicable to failure rate level "L").

Contact stabilization time: 2.5 milliseconds (ms) maximum. (Applicable to failure rate levels "M", "P", and "R").

Overload (high level only): 4 ampere resistive at 28 V dc. 1.0 ampere inductive at 28 V dc (ac not applicable).

(B) Neutral Screen: Applicable

(B) COIL DATA (EACH COIL): (See table I).

Operate time (latch and reset): 4.0 ms maximum over temperature range with rated coil voltage.

(B) Release time: Not applicable.

ELECTRICAL DATA:

Insulation resistance 1/: 10,000 megohms minimum, except the resistance between coil and case at high temperature shall be 1,000 megohms minimum.

Dielectric withstanding voltage 1/:

	Sea level V rms (60 Hz)	Altitude V rms (60 Hz)
Between case, frame, or enclosure and all contacts	750	350 All terminals to case
Between case, frame, or enclosure and coils	500	
Between all contacts and coils	750	
Between open contacts in the latch and reset positions	500	
Between contact poles	750	
Between coils of dual coil relays	500	

(B) DIODE CHARACTERISTICS 2/:

Maximum negative transient: 1.0 volt.

Breakdown voltage: 100 V dc at 10 microamperes (μA).

Maximum leakage current: 1 μA at 50 V dc.

(B) Coil transient suppression: Applicable

(B) Semiconductor in process screening: Applicable, visual inspection of semiconductors shall be in accordance with MIL-STD-750, method 2074.

ENVIRONMENTAL DATA:

Temperature range: -65°C to +125°C.

(B) Vibration (sinusoidal): MIL-STD-202, method 204, contact chatter shall not exceed 10 microseconds maximum for closed contacts and 1 microsecond maximum closure for open contacts.

(B) Vibration (random): MIL-STD-202, method 214, test condition IG. Contact chatter shall not exceed 10 microseconds maximum for closed contacts, and 1 microsecond maximum closure for open contacts (Applicable to qualification and group C testing only).

(B) Shock (specified pulse): MIL-STD-202, method 213, test condition C (100G). Contact chatter shall not exceed 10 microseconds maximum for closed contacts and 1 microsecond maximum closure for open contacts.

Magnetic interference: Applicable.

Resistance to soldering heat: Applicable.

Acceleration: Applicable.

1/ Insulation resistance and dielectric withstanding voltage tests must always precede all other specified electrical measurements. Connect all coil terminals together to avoid damage to the diode.

(B) 2/ In all tables relating to qualification testing and group A testing, delete coil resistance and substitute the following tests: (Test each coil individually.) Diode breakdown and block integrity with applicable voltage applied to the relay coil circuit in the reverse direction, monitor leakage current with dc microammeter or oscilloscope. Leakage current shall not exceed the specified value.

PHYSICAL:

Terminals: See figure 1 and table 1.

Terminal strength:

Pull test: 1.5 ±0.2 pounds.

Bend test: Not applicable.

(B) Solderability: Applicable.

Dimensions and configuration: See figure 1.

Weight: 7.6 grams (0.27 ounce) maximum.

Identification marking (full): Applicable.

LIFE TEST REQUIREMENTS:

(B) High level: 100,000 cycles per relay.
(B) Low level: 100,000 cycles plus 900,000 cycles mechanical life.

PART NUMBER: M39016/36- (dash number from table I and suffix letter designating failure rate level).

(B) TABLE I. Dash number and characteristics. 1/ 2/

Dash number 3/	Mount	Terminal	Coil voltage (V dc)		Coil resistance at +25°C tolerance ±10% (ohms)	Specified pickup (latch/reset) value (voltage) (V dc)	
			Rated 4/	Max		25°C	125°C
-001	No mount	Wire lead (SP)	6.0	7.2	37	3.6	4.8
-002	No mount	Wire lead (SP)	12.0	14.5	145	6.2	8.6
-003	No mount	Wire lead (SP)	26.5	35.0	975	14.5	19.0
-004	Flange	Solder lug	6.0	7.2	37	3.6	4.8
-005	Flange	Solder lug	12.0	14.5	145	6.2	8.6
-006	Flange	Solder lug	26.5	35.0	975	14.5	19.0

1/ Each relay possesses high level and low level capabilities. However, relays previously tested or used above 10 mA resistive at 6 V dc maximum or peak ac open circuits not recommended for subsequent use in low level applications.

2/ WARNING: When latching relays are installed in equipment, the latch and reset coils should not be pulsed simultaneously. Coils should not be pulsed with less than the nominal coil voltage and the pulse width should be a minimum of three times the specified operate time of the relay. If these conditions are not followed, it is possible for the relay to be in the magnetically neutral position.

3/ The suffix letter L, M, P, or R to designate the applicable failure rate level shall be added to the applicable listed dash number. Failure rate level (percent per 10,000 cycles): L, 3.0; M, 1.0; P, 0.1; R, 0.01. Example, 001L - - - 006R.

4/ CAUTION: Use of any coil voltage less than the rated voltage will compromise the operation of the relay.

(B) TABLE II. Qualification inspection and sample size.

Single submission	Group submission	
24 units plus 1 open unit for level L at C = 0 1/ 33 units plus 1 open unit for level M at C = 0 1/ Qualification inspection as applicable	M39016/36-006	24 units plus 1 open unit for level L at C = 0 1/ 33 units plus 1 open unit for level M at C = 0 1/ Qualification inspection as applicable
	M39016/36-002	2 units qualification inspection table, group II.
	M39016/36-001	2 units qualification inspection table, group II, and terminal strength, resistance to soldering heat, and seal.

1/ The number of units required for qualification testing will be increased as required in group V, table II, MIL-R-39016, if the relay manufacturer elects to test the number of units permitting one or more failures. Prior to performance of qualification inspection testing; the relay manufacturer shall preselect the sample size.

CONCLUDING MATERIAL

Custodians:
Army - ER
Navy - EC
(B) Air Force - 85

Review activities:
Army - AR, SL
Navy - AS, OS, SH
(B) Air Force - 99
DLA - ES

User activities:
Navy - MC
(B) Air Force - 11, 19

Preparing activity:
Navy - EC

Agent:
DLA - ES

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